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Path Integrals, Bayesian Vision, and Is Gaussian Quadrature Really Good?

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Abstract

Physicists know how to integrate over all possible paths, computer-vision experts want to assign probabilities to arbitrary scenes, and numerical analysts act as if some continuous functions are more typical than others. In these three disparate cases, a more flexible notion of integration is being invoked than is possible in the traditional foundations for mathematics. If allowed to enter a highly speculative mode, such as the intersection of category theory and computer science, we may bump into some solutions to the problem.
